Multivariate Analysis

Input outside the classroom &
Vocabulary performance

Hui Ping,Chan

Department of Applied Linguistics, University of Groningen

Motivation

- The role of input outside the classroom in Taiwan
- Which input outside the classroom?

Research Question

- How can the vocabulary test score be predicted by different types of English input outside the classroom?

Operationalization

- Vocabulary Score
- Hours per week of five types of English input
  (Social network,movie, song, magazine, online game)

Experiment

- 55 female 17-year-old high school students
- Questionnaire
  (Social network,movie, song, magazine, online game)
- Vocabulary Test

Input & vocabulary performance

Data exploration

Social

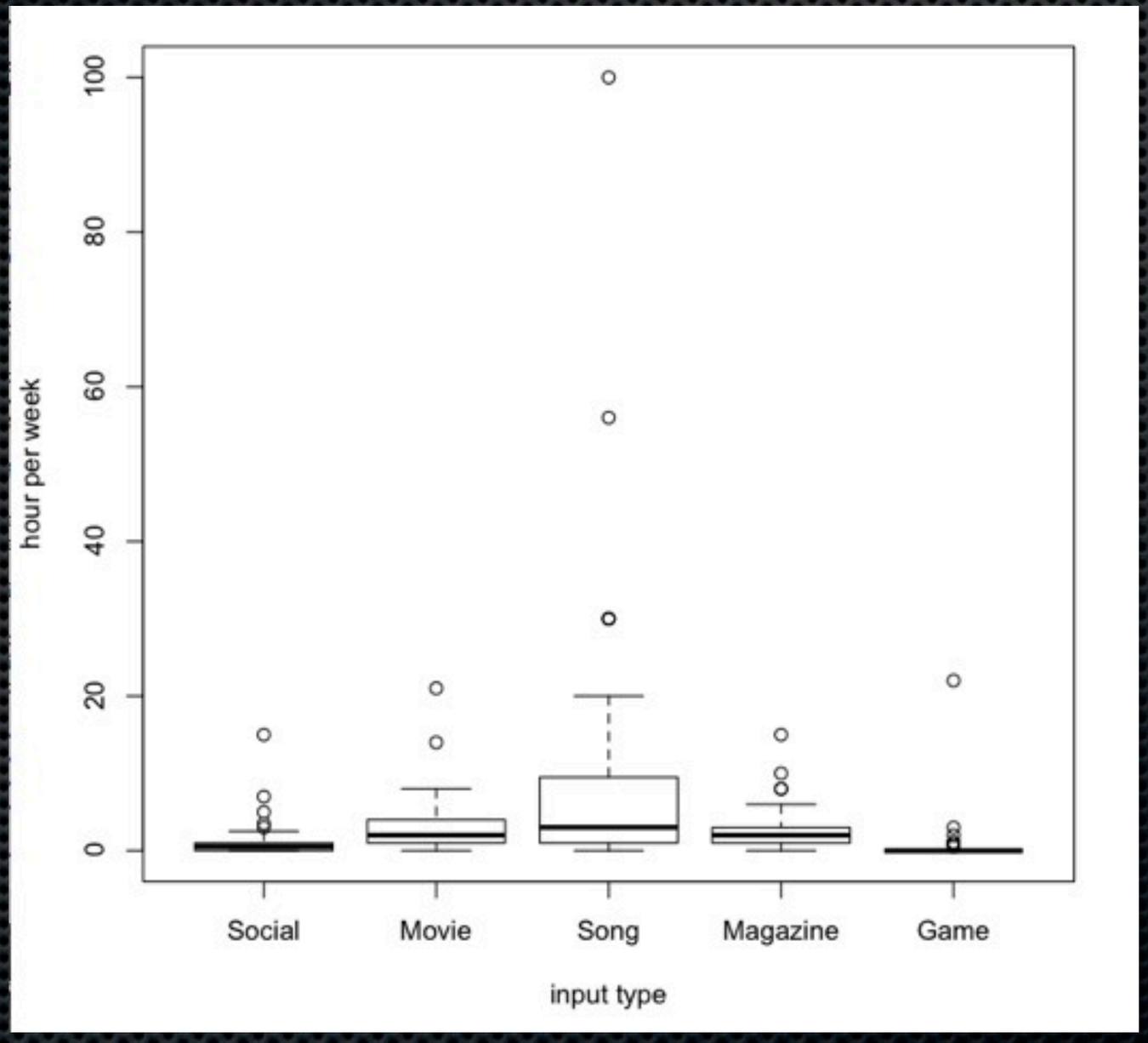
Mean=1.13

SD=2.23

Movie

Mean=3.11

SD=3.48



Song

Mean=8.4

SD=15.72

Magazine

Mean=2.63

SD=2.62

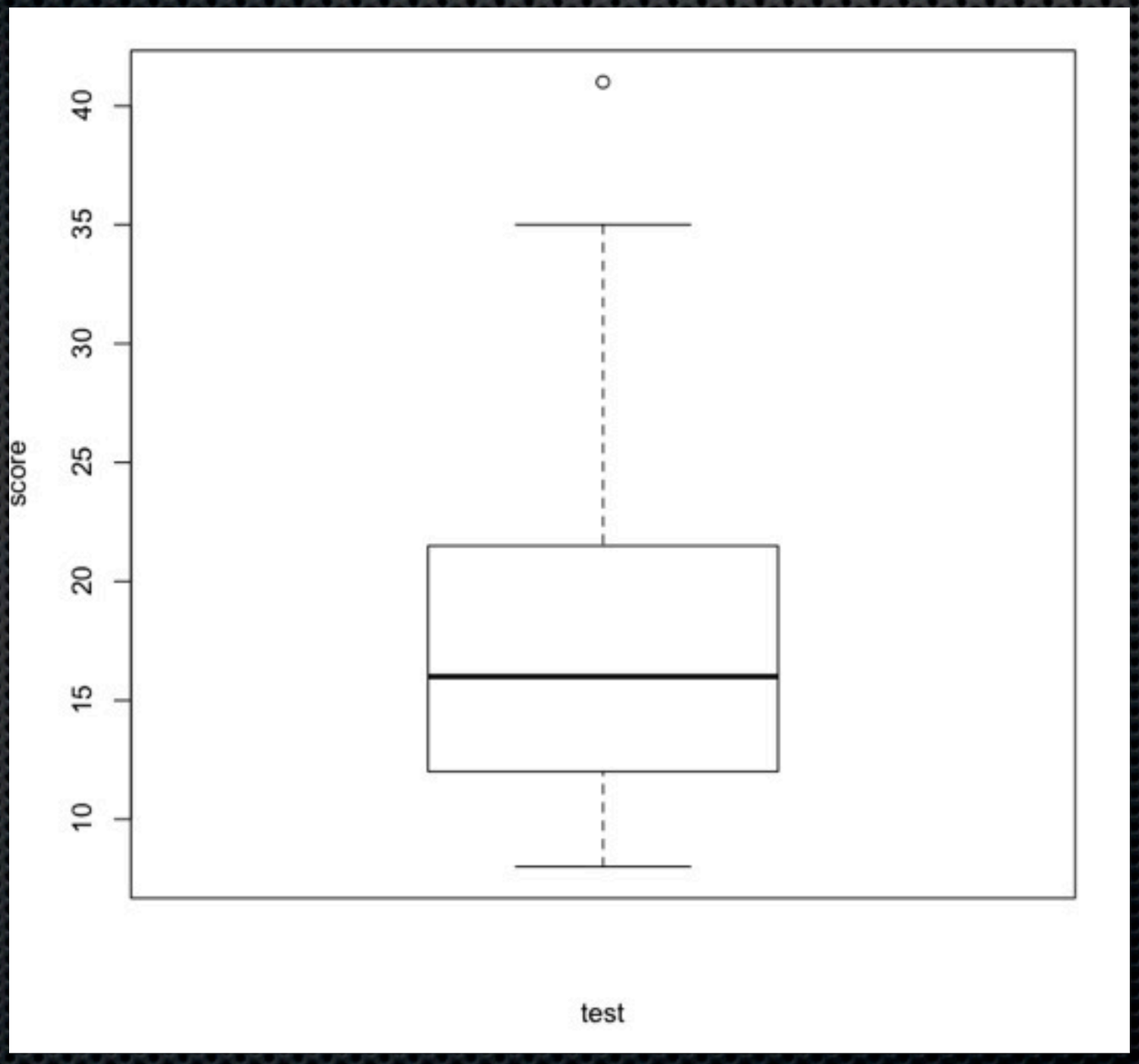
Game

Mean=0.55

SD=2.9

Input & vocabulary performance

Data exploration



Test

Mean=17.9

SD=7.82

Input & vocabulary performance

Data exploration

```
Call:
lm(formula = Test1 ~ Social + Movie + Song + Magazine + Game,
    data = IALL)

Residuals:
    Min      1Q  Median      3Q     Max
-10.600  -5.593  -1.640   3.752  18.299

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) 14.79313    1.71604   8.621 1.16e-11 ***
Social      -0.31689    0.48239  -0.657   0.5141
Movie        0.77051    0.29197   2.639   0.0109 *
Song         0.09078    0.06948   1.307   0.1970
Magazine     0.12107    0.38002   0.319   0.7513
Game         0.06455    0.34610   0.187   0.8528
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 7.481 on 53 degrees of freedom
Multiple R-squared: 0.1638, Adjusted R-squared:  0.0849
F-statistic: 2.076 on 5 and 53 DF,  p-value: 0.0829
```

Input & vocabulary performance
Data exploration

- Only movie significantly influences the linear prediction of Vocabulary score.
- One unit of movie input increase leads to the increase on average score in vocabulary score by 0.77 holding other variables constant.

Input & Vocabulary performance
Akaike Information Criteria (AIC)

- Measure of the relative goodness of fit.
- AIC values provide a means for model selection.
- The smaller the value of AIC, the better the fit.

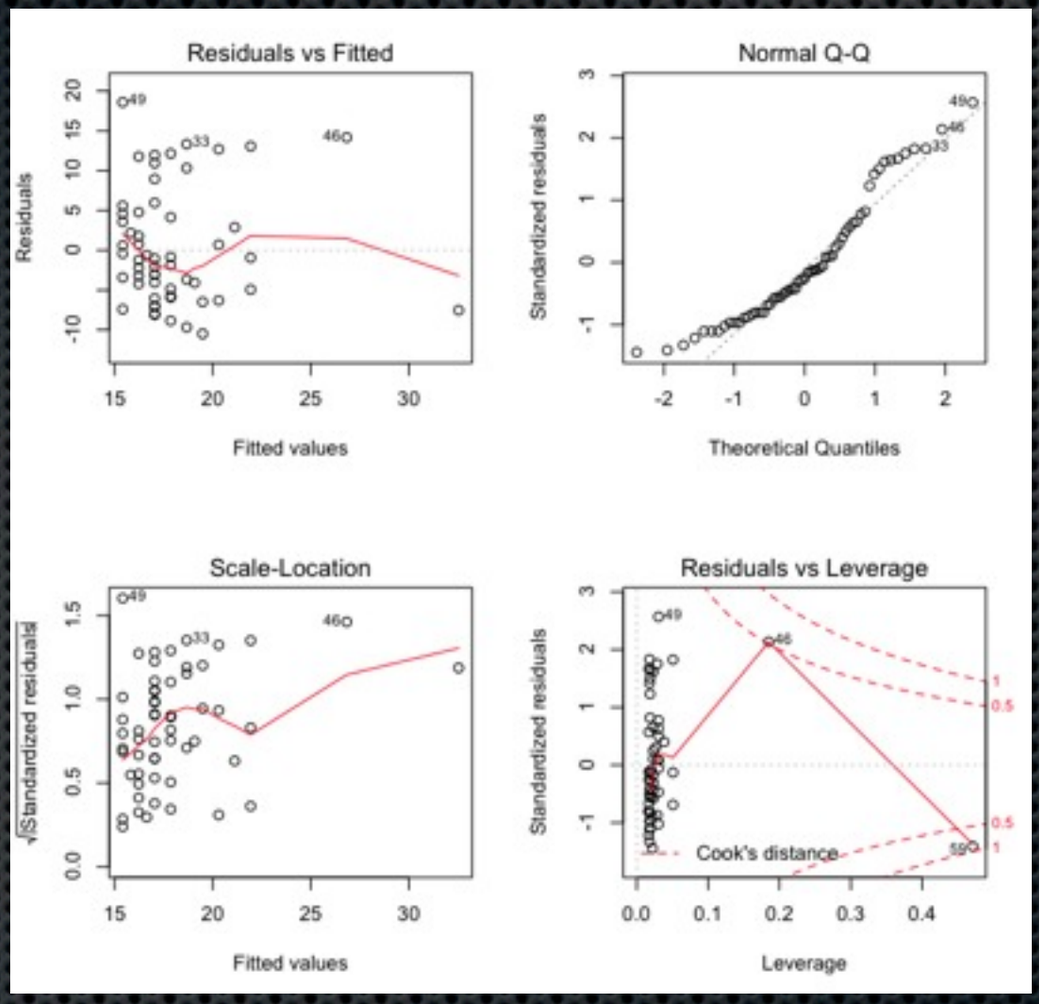
Input & Vocabulary performance

Formal report

- The best model found with AIC is that the movie input is the predictor of vocabulary score.

Input & Vocabulary performance

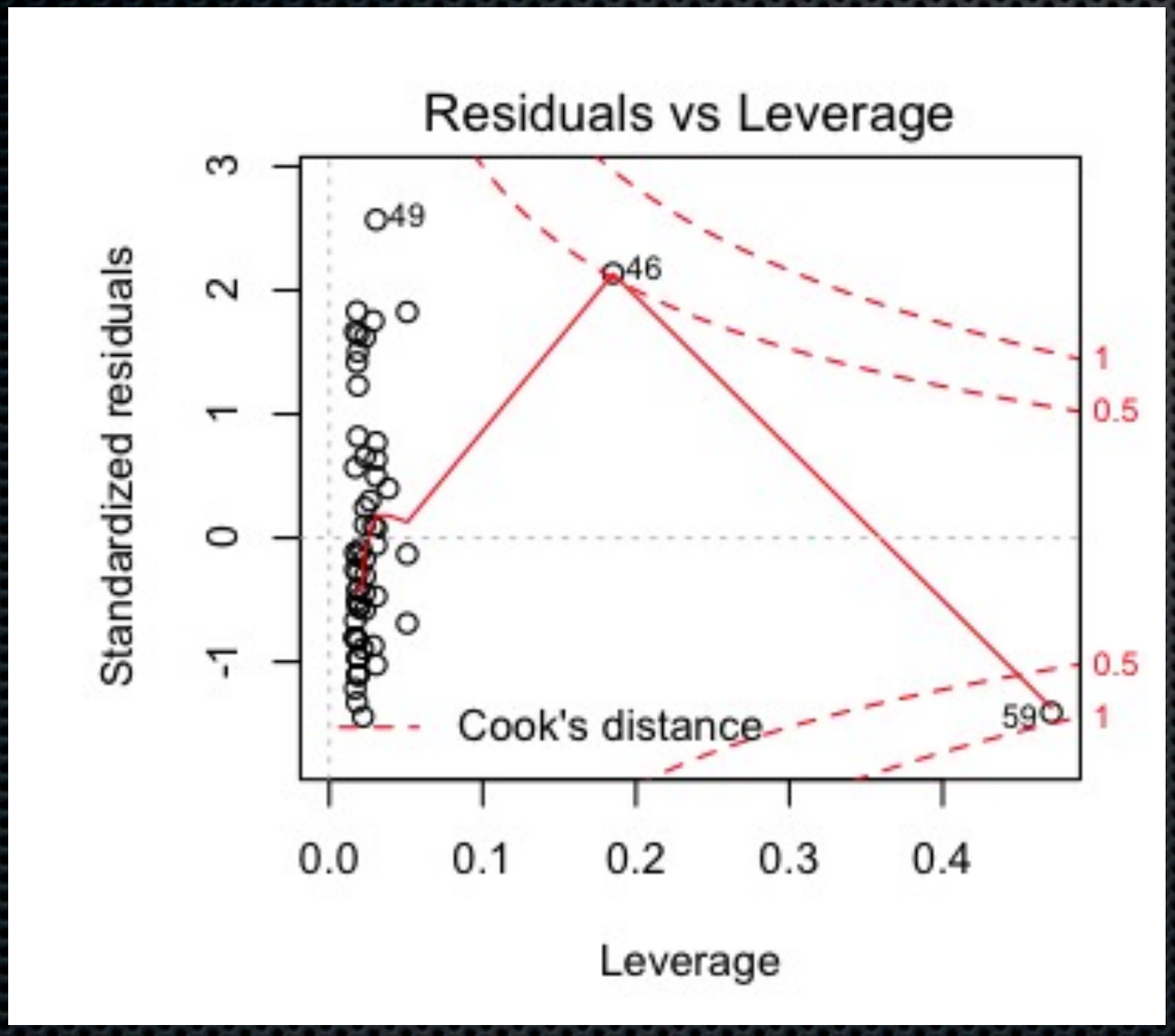
Formal report



- The diagnostic panel shows that the model roughly fits linearly, has normal distribution and does not have influential outliers.

Input & Vocabulary performance

Cook's distance: Outliers?



Value > 1,
exclude outlier

Value < 1,
ignore outlier

Input & Vocabulary performance
Formal report

- The more movie input students receive, the better the vocabulary score they get. We should encourage the students who wish to develop their vocabulary to watch more English movies.

Input & Vocabulary performance
Discussion

- Generalization
- Limited variation explained
- Type of Movie / How to watch movie